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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/726,248	12/02/2003	James E. Watson	59376US002	3537

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EXAMINER	
GUHARAY, KARABI	

ART UNIT	PAPER NUMBER
2889	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/726,248	WATSON ET AL.	
	Examiner	Art Unit	
	Karabi Guharay	2889	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *Amendment, filed on 12/19/2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-12,14-26,28-34 and 36-39* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-12,14-26,28-34 and 36-39* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *2/29/2008*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Response to Amendment

Amendment, filed on 12/19/2007 has been considered and entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1, 3-9, 11-12, 14-23, 25-26, 28-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Durocher et al. (US 6733711), in view of Miller et al. (US 6155699), further in view of Fleming (US 6,172,810).

Regarding claim 1, Durocher et al. disclose a light source (Fig 11) comprising an array of LED dies (a plurality of LED dies 59) capable of emitting LED light; optical couplers (plurality of lens 67) for coupling light from respective LED dies (lines 57-59 of column 8), phosphor patches (LED dies 59 contains a phosphor layer on top of it, see lines 61-62 of column 8) disposed between the LED dies and the optical coupler (67) to

convert at least a portion of the LED light propagating to the optical coupler (lines 41-48 of column 8).

But Durocher fails to disclose a continuous intermediate layer comprising a multiple-layer polymer optical film, disposed between LED dies and the phosphor patches, the continuous intermediate layer transmitting LED light and reflecting light converted in the phosphor, intermediate layer having a first side facing the LED and a second side facing the coupler, and phosphor is disposed on the second side of the intermediate layer.

However, In the same field of LED, Miller discloses a single LED device (see Fig 2 & 6) having an intermediate layer (DBR mirror 30, 46) disposed between LED die (12, 42) and the phosphor patches (36, 48) transmitting LED light and reflecting light converted in the phosphor, intermediate layer (DBR mirror 30, 42) having a first side facing the LED and a second side facing the coupler (22 or 50, see Fig 2), and phosphor is disposed on the second side of the intermediate layer (lines 10 of column 5 -line 45 of column 6).

Further Miller teaches that having a wavelength selective reflector (in this case DBR mirror 30, 46) enhances the light output by allowing high percentage of primary light to reach phosphor and reflecting much of the converted secondary light that is emitted towards the LED (lines 65 of column 2-line 9 of column 3).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate a continuous wavelength selective reflector layer between the array of LED s and the phosphor, as disclosed by Miller in case of a

single LED, in the array of LED device of Durocher to cover all the LEDs of the array in order to improve light output from the array device.

But, Miller teaches a retro-reflective or trans-reflective optical device such as DBR which is made up of multiple layers of inorganic materials having different refractive indices, instead of claimed multiple layer polymer optical film reflector.

However, Flemings, in the field of trans-reflective or retro-reflective optical materials, teaches a multiple layer polymer film reflector (14 of Fig 3; lines 8-18 of column 4) and further teaches that multiple polymer layers are advantageous over the multiple inorganic dielectric mirrors since multiple polymer layer reflectors are highly reflective to light in a desired wavelength band and also is not susceptible to air or moisture induced corrosion (lines 15-24 of column 2).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use multiple layer of polymers, as taught by Fleming et al., in the combined structure of Durocher and Miller, since multiple layer polymers are resistance to the environmental corrosion than the inorganic layers.

Regarding claim 3, Durocher discloses that the LED dies are encapsulated (lines 30-32 of column 8).

Regarding claim 4, Durocher discloses that the LED dies are disposed on a substrate (41 of Fig 5).

Regarding claim 5, the combined structure of Durocher & Miller discloses at least one stand off disposed between intermediate layer and the substrate (see Fig 5 of "711).

Regarding claim 6, Durocher discloses the coupler (31) formed with aperture having reflective sidewalls (36, 39 of Fig 3).

Regarding claim 7, Durocher discloses that the phosphor patches register with respective apertures (35).

Regarding claim 8, the combined structure of Durocher & Miller discloses that the phosphor patches extend into the apertures from the intermediate layer (since the phosphor layer is positioned above the intermediate layer with in the aperture (35).

Regarding claim 9, Miller discloses a reflecting layer (side wall of 14) disposed to reflect LED light that has passed through the phosphor layer back to the phosphor layer (since reflecting layer 14 extends above the phosphor patch 52). The same reason for combining art as in claim 1 applies.

Regarding claim 11, Durocher discloses that the electric power is applied to the LED (which inherently provides a power supply, see lines 50-52 of column 1).

Regarding claims 12, 26, Durocher discloses a light source (Fig 11) comprising two or more LED dies (a plurality of LED dies 59) arranged in array capable of emitting LED light, two or more optical couplers (plurality of lens 67) for coupling light from respective LED dies (lines 57-59 of column 8).

However, Durocher et al. do not disclose a continuous intermediate layer comprising a multiple layer polymer optical film reflector disposed between the array of LED dies and the couplers, the continuous intermediate layer being substantially transparent to the LED light and a phosphor layer disposed on the continuous

intermediate layer between the continuous intermediate layer and the couplers for converting at least a portion of the LED light to light at a converted wavelength.

However, In the same field of LED, Miller discloses a single LED device (see Fig 2 & 6) having an intermediate layer (DBR mirror 30, 46) disposed between LED die (12, 42) and the couplers (lens 22) which is transparent to LED light, and a phosphor layer (36) disposed on the continuous intermediate layer (30) between the continuous intermediate layer and the couplers for converting at least a portion of the LED light to light at a converted wavelength (phosphor converts some of the LED lights)

Further Miller teaches that having a wavelength selective reflector (in this case DBR mirror 30, 46) enhances the light output by allowing high percentage of primary light to reach phosphor and reflecting much of the converted secondary light that is emitted towards the LED (lines 65 of column 2-line 9 of column 3).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate a continuous wavelength selective reflector layer between the array of LED s and the coupler and a phosphor layer on the intermediate layer, as disclosed by Miller in case of a single LED, in the array of LED device of Durocher to cover all the LEDs of the array in order to improve light output from the array device.

Further Miller teaches a retro-reflective or trans-reflective optical device such as DBR which is made up of multiple layers of inorganic materials having different refractive indices, instead of claimed multiple layer polymer optical film reflector.

However, Flemings, in the field of trans-reflective or retro-reflective optical materials, teaches a multiple layer polymer film reflector (14 of Fig 3; lines 8-18 of column 4) and further teaches that multiple polymer layers are advantageous over the multiple inorganic dielectric mirrors since multiple polymer layer reflectors are highly reflective to light in a desired wavelength band and also are not susceptible to air or moisture induced corrosion (lines 15-24 of column 2).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use multiple layer of polymers as taught by Fleming in the combined structure of Durocher and Miller, since multiple layer polymers are resistance to the environmental corrosion.

Regarding claim 14, Durocher discloses that the LED dies are encapsulated (lines 30-32 of column 8).

Regarding claim 15 & 31, Durocher discloses that the LED dies are disposed on a substrate (41 of Fig 5).

Regarding claims 16 & 32, Durocher discloses at least one stand off disposed between intermediate layer and the substrate (see Fig 5).

Regarding claim 17, Durocher discloses the coupler (31) formed with aperture having reflective sidewalls (36, 39 of Fig 3).

Regarding claims 18 & 28, Miller et al. disclose that the phosphor layer (36) is provided on the intermediate layer (30) and positioned corresponding to areas of the intermediate layer illuminated by LED die (see Fig 2).

Regarding claims 19-20, Miller et al. disclose that the coupler (14) is formed in aperture through the coupler sheet and the phosphors are registered with the apertures (Fig 2), and phosphor patch (36) register with the aperture and extends into the aperture from the intermediate layer (Fig 2).

Regarding claims 21 & 23, Miller et al. disclose that the intermediate layer (30) reflects converted wavelength (lines 40-45 of column 6).

Claims 22 & 30, recite essentially the same limitations of claim 9. So Claims 22 & 30 are rejected as claim 9 (see rejection of claim 9).

Regarding claim 25, Durocher discloses that the electric power is applied to the LED (which inherently provides a power supply, see lines 50-52 of column 1).

Regarding claim 29, Miller et al. disclose that the first layer (30) reflects light converted by the phosphor to a longer wavelength than the wavelength of the LED light (lines 17-33 of column 7).

Claims 10 & 24, are rejected under 35 U.S.C. 103(a) as being unpatentable over Durocher , et al. and Miller and Fleming, as applied to claims 1 and 12 above, and further in view of Ota et al. (US 6943380).

Regarding claim 24, combined structure of Durocher, Miller and Fleming teaches all the limitations of claim 24 except for a set of optical fibers disposed to receive light from the coupler.

However, Ota et al. discloses LED light source and further teaches the use of optical fibers for extracting and optical transmission of light emitted from LED (lines 28-35 of column 11).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use set of optical fibers in order to transmit light from the LED array.

Claims 33-34, 36-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimizu et al. (US 6949772), in view of Miller et al. (US 6155699) further in view of Fleming et al. (US 6,172,810).

Regarding claims 33-34, 36-39, Shimizu et al. disclose a method of assembling a light source comprising providing a plurality of LED dies arranged in a regular array patterns on a LED subassembly and attaching the LED subassembly (see Fig 1a & 1b) disposing a continuous intermediate layer (24) providing reflecting layer and the transparent mold which is substantially transparent to the LED light (lines 7-16 of column 2), positioning the continuous intermediate layer over the LED dies so that light passes through the continuous intermediate layer (24 of Fig 1b), where continuous intermediate layer comprises a plurality of stand-offs (24 of Fig 1a) and attaching the intermediate layer comprises attaching the stand-offs to the LED subassembly (lines 43-57 of column 1).

However, Shimizu et al. fails to disclose a layer of phosphor as patches on a surface of the continuous intermediate layer to areas where light passes from the LED dies, and the intermediate layer transmits LED light but reflects light that is wavelength converted in the phosphor.

Miller et al. in the same field of LED lighting disclose a light source (see Fig 2) comprising LED die (12), an intermediate layer (DBR 28, 30) comprising a multiple layer

optical film reflector, disposed over the LED die, the intermediate layer (28, 30) layer being substantially transparent to the LED light (lines 9-18 of column 6), the LED light propagating through the first layer from a first side to a second side and a phosphor layer disposed as patch (36) on the second side (lines 62-67 of column 5), the first layer transmits LED light but reflects light that is wavelength converted in the phosphor (lines 10-45 of column 6). Miller further teaches that such DBR mirror (30) and the disposition of phosphor (36) on the DBR mirror improves the flux of light emitted from the light source (lines 58 of column 20-line 9 of column 3).

Thus it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate a phosphor layer (36) as disclosed by Miller et al. in the device of Shimizu et al, since this will provide improved light emission.

Further MIller teaches a retro-reflective or trans-reflective optical device such as DBR which is made up of multiple layers of inorganic materials having different refractive indices, instead of claimed multiple layer polymer optical film reflector.

However, Flemings, in the field of trans-reflective or retro-reflective optical materials, teaches a multiple layer polymer film reflector (14 of Fig 3; lines 8-18 of column 4) and further teaches that multiple polymer layers are advantageous over the multiple inorganic dielectric mirrors since multiple polymer layer reflectors are highly reflective to light in a desired wavelength band and also are not susceptible to air or moisture induced corrosion (lines 15-24 of column 2).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use multiple layer of polymers, as taught by Fleming et

al., in the combined structure of Durocher and Miller, since multiple layer polymers are resistance to the environmental corrosion.

Response to Arguments

Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karabi Guharay whose telephone number is 571-272-2452. The examiner can normally be reached on Monday-Friday 9:00 am - 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minh-Toan Ton can be reached on 571-272-2303. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Karabi Guharay/
Primary Examiner, Art Unit 2889